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1. Introduction

What is at stake in considering how sound and listening produce knowledge? This article proposes that sound studies, largely occupied with theorizing how knowledge is produced through sound and listening, requires a greater interrogation of the subject-object relation via feminist epistemologies. I draw on the language of science studies to understand all sound studies scholarship as some form of *sonic knowledge production*. Feminist epistemologies, positioned against a presumed neutrality in science and philosophy, have demonstrated the uncritical continuation of a traditional subject-object dualism to be a crude limitation on knowledge practices. Much of this work has taken the gesture of ‘opening up’ and asking how re-thinking commonly held notions can lead to new insights into existing paradigms.¹ In examining the subject-object relation in sonic knowledge production, most often theorized through listening, the majority of sound studies work leaves both the subject and object implicit.² I contend that this seemingly innocent oversight, read through feminist epistemologies, is in fact an integral shortcoming in theories of sonic knowledge production. By bringing together affordances of ‘sounding’ to Donna Haraway’s ethico-onto-epistemological³ project of ‘Situated Knowledges’,⁴ *sounding situated knowledges* is suggested as a method which re-negotiates the dominant dualisms of traditional nature-culture and subject-object relations for sound studies. I suggest revisiting debates around the ‘nature of sound’ with the alternative Harawayan concept of the ‘natureculture of sound’.

The sounding past provides particular problems for theorizing sonic knowledge production. The emerging field of archaeoacoustics (acoustic archaeology) proposes that investigating the acoustic properties of archaeological sites could provide crucial clues in understanding past human behaviour there. Research beginning in the 1980s has suggested that the acoustics of caves with Paleolithic rock art may explain the ‘mysterious’ positioning of paintings.⁵ Acoustic archaeology, driven as much by non-professional archaeologists as by formally trained archaeologists, was established as a field in the mid-2000s.⁶ Since then, a practice of acoustic tests has been developed which help to inform archaeological theories around specific sites. As part of a movement towards multi-sensory archaeology, these investigations defy the

heavy reliance on visual methods and take seriously the multi-modal experiences of past cultures to think through possible meanings of the material remains of archaeological sites. Whilst there are fascinating implications about how knowledge can be produced through sound and listening, given the small (but growing) number of researchers in the field, the valuable challenges proposed by gender archaeology and post-colonial archaeology have not yet been applied to archaeoacoustics. This article addresses some of the issues arising when feminist epistemologies are engaged in archaeoacoustics.

On gendered narratives in the history of the primate studies Haraway asserted 'The Past is the Contested Zone', a statement which will be shifted from the biological sciences and applied to archaeological sonic knowledge production in this article.⁷ Haraway's feminist, anti-capitalist, anti-racist critiques of white Western, masculinist technoscience across her work enact a deconstructive intervention to defy accusations of naturalism-essentialism and social constructivism to offer 'a serious historical effort to get elsewhere'.⁸ Given the contested nature of 'the past', this article re-examines the subject-object relation in sonic knowledge production and posits archaeoacoustics as a site of a potential political-philosophical 'elsewhere' described by Haraway.⁹ Haraway's situated knowledges are taken as a key methodological project in opening up this elsewhere. As part of this argument I demonstrate that without this intervention of feminist sound studies, the emerging field of archaeoacoustics cannot realize the potential epistemological opportunities within it.

I propose the figure of echo, which mediates subject-object relationships in sound, as a material-semiotic¹⁰ figuration akin to Haraway's infamous cyborg.¹¹ From the echoes and reverberations theorized in archaeoacoustic research so far,¹² to the everyday echoes theorized in auditory architecture,¹³ the proposed cyborgian figure of echo in sounding situated knowledges is tasked with a critical re-navigation of notions of subjectivity and objectivity in sound studies. I argue that the dominant sonic naturalism which prevails in sound studies can be countered by a feminist methodology of sounding situated knowledges. A diffractive methodology for sound is proposed via the cyborgian figure of echo which can enact a disturbance within traditional sonic thinking. Drawing on Steven Feld's notion of 'acoustemology' and Julian Henriques' 'sonic logos', I will suggest what the specific affordances of 'sounding' in sounding situated knowledges could contribute. A cyborgian 'non-innocent' listening of sounding situated knowledges could enable archaeoacoustics to exploit the 'elsewhere' of sonic knowledge production. More broadly, it aims to centre the pressing critical re-negotiation of the subject-object relation in sound studies by arguing for the importance of both embodiedness *and* situatedness in sonic knowledge production.

2. Against Sonic Naturalism

Debates around 'the nature of sound' are rife in sound studies. For the purposes of this argument, the ambiguity between nature with a small "n" and a

capital “N” is proposed to belie a dominant tendency in the field I will term sonic naturalism. Most palpable in R. Murray Schafer’s work on ‘soundscapes’, a naturalistic thinking about sound has perpetuated throughout the field, taking on new forms within more recent new materialism debates. Whether in speaking about nature sounds, naturalized notions of the sonic or ‘the nature of sound’, sonic naturalism is propagated by a traditional subject-object relation in sonic knowledge production founded upon the stable dualisms of Western science and philosophy (e.g. culture-nature, subject-object, mind-matter). It is necessary to address how a neglect to critically reassess the subject-object relation in sound has led to this continuation of a persistent sonic naturalism.

Schafer’s work on soundscapes in the acoustic ecology movement has played an influential role in sound studies. I consider his work to constitute an archetypal account of sonic naturalism. Schafer’s widely read treatise on ‘the soundscape’ admonishes the ‘unnatural’ sounds of the ‘loud’ industrialized world since modernity in favour of ‘natural’ ones of a ‘quieter’, pre-industrial past.¹⁴ The origin myth of ‘the natural soundscape’ located by Schafer is clearly gendered. In his description of the sea at the start of the book he describes, ‘the ocean of our ancestors is reproduced in the watery womb of our mother [...] the relentless masses of water pushed past the first sonar ear’.¹⁵ The sonic expression of a white, masculinist patriotism which reminisces with nostalgia about a quieter, ‘more natural’ past has been critiqued by Marie Thompson as part of a Schaferian ‘aesthetic moralism’ which valorizes silence over noise.¹⁶ In terms of the subject-object relation in sound, Schafer’s figure of the ‘earwitness’ as the attentive, ‘authentic’ listener is typical of the oft-implied ahistorical masculinist subject, who produces knowledge about ‘the soundscape’, its feminized object of closer study.¹⁷ Feminist science studies has long demonstrated scientific knowledge production vis-à-vis nature as inherently gendered. Evelyn Fox Keller’s analysis of the notion of nature in Plato and Francis Bacon demonstrates how the invention of (modern) science is expressed as a masculinist mastery and domination over overtly feminized depictions of nature, evidenced by the use of graphic sexualized language.¹⁸ Although there are considerable dissimilarities between scientific and philosophical knowledge production, feminist epistemologies have dealt with all forms of knowledge production as gendered.¹⁹ Therefore, the subject-object relation has comparable implications for both scientific and sonic knowledge production: patriarchal ideas structure sonic naturalism in theories of sound, and Schafer’s account quite directly mirrors Keller’s analysis in its gendered dialectic of control by the masculine ‘subject’ over the feminine ‘object’ of nature in science.

It would be unfair and incorrect to relegate the diverse and growing body of scholarship of sound studies to a crude binary of masculinist domination over feminized sonic natures based on Schafer’s enthusiastic endorsement of so-called natural soundscapes. However, taking the gendered subject-object relation as the site of sonic knowledge production, feminist epistemologies requires us to understand in more detail *how* knowledge is produced. Keller’s

analysis, which proposes a dialectic of simultaneous ‘appropriation and denial’ of the feminine, suggests the complexity of these relations.²⁰ Borrowing from Foucauldian power-knowledge relations may help to explain why any clear cut attempts to map feminine/masculine, object/subject, nature/culture dualisms directly onto one another are unsuccessful. In another key sound studies text, Jean-Luc Nancy’s *Jean/Luc Nancy’s Listening*, a different facet of sonic naturalism is expressed. Nancy’s philosopher-listener is focused on a sensual subjectivity aimed towards resonance, a practice of philosophical understanding. This resonance, perhaps not coincidentally, is also gendered in its comparison to ‘the womb [...] of a pregnant woman’.²¹ Here, however, the feminine – alluded to as the natural – can be construed as a philosophical mode which challenges traditional notions of subjectivity. Yet Robin James critiques Nancy’s notion of listening or ‘to be listening’ for its reassertion of a presumed masculine listener-subject. This maintains normalized masculinist attributes of agency and authority whilst appropriating the characteristics of affect from stereotypically feminized experiences: ‘Nancy’s approach to affect is one version of the well-worn notion of aesthetic receptivity, a concept that values femininity only when it appears in males, only when it dons the trappings of whiteness, and thus continues to marginalize women and non-whites as listeners [...] it] reinforce[s] an underlying patriarchal, Orientalist value structure’.²² Although feminized ideas of sound are explored through affect by Nancy in a manner which does not simply celebrate ‘the natural’ as Schafer does, the listening subject is nevertheless reinforced as normatively white, European and masculine. Through resonance, the ‘self’ encounters the ‘form, structure, and movement of an infinite referral [*renvoi*],’ which purports to dissolve the subject-object division, yet deceptively and contrary to its intentions, the continued persistence of these dualisms serves to reify the stability of the binary of subject and object.²³

More recent debates under the broad banner of new materialism reveal how a renewed interest in discussing ‘the nature of sound’ allow sonic naturalism to persist in new forms. Christoph Cox, using theories of music in Schopenhauer, Nietzsche, and Deleuze, proposes a sonic philosophy to counter the idea of ‘reality’ being reduced to a representation of it. Cox aims to forge an anti-representational theory which aims to ‘grasp the nature of sound’. This is a ‘material, realist’ account of sound as an ‘asignifying material flux’.²⁴ His conflation of realism and materialism will be addressed later. Although it purports to overcome dualistic thought of the Kantian divide between phenomenon and noumenon as part of the speculative realism school of thought,²⁵ Cox perpetuates more troubling dualisms which demand greater attention. Firstly, Cox’s sonic philosophy comes from a disembodied rationality which engages neither with the problem of the body nor with the processes of knowledge production. The legacy of the disembodied rationality of the philosopher can be traced through a Kantian masculinist separation of emotions, feelings and desires from the faculty of reason, well into post-Kantian anti-correlationist thought.²⁶ The persistence of the unlocatable, disembodied knower perpetuates the unaccountability of its knowledge production. Iris Van der Tuin and others have criticized object-oriented

ontologies, which share this post-Kantian preposition with speculative realism, on the grounds that the rational subject who can supposedly access the ontology of objects is ultimately always informed by embodied encounters which remain unaccounted for.²⁷ As Van der Tuin articulates, the ‘ontological turn, bereft of human subjectivity, provides for the capital-S Subject to come back with a vengeance’.²⁸ Cox speaks disdainfully of contemporary cultural theory as falling prey to ‘provincial and chauvinistic anthropocentrism’, without accounting for the anthropogenic nature of knowledge production itself, including his own.²⁹ Therefore despite Cox’s post-Kantian aspirations, the reification of the masculinist, white European subject is a resurgence of the Cartesian subject. This complete failure to address subjectivity in such a foray exposes a new form of posthuman sonic naturalism.

Secondly, Cox’s attempt to think as sound-in-itself, or sonic matter, furthermore consolidates this posthuman sonic naturalism by perpetuating the division between language and matter. Cox speaks about the shortcomings of theories of signification and representation being unable to grasp the ‘nature of sound’. In the former, ‘Nature [sic]’, Cox asserts, ‘is either cast aside as insignificant or deemed a cultural projection, a social construction’, which his theory of sonic realism/sonic materialism aims to ‘grasp’.³⁰ His naturalism, via Nietzsche, is a supposed anti-essentialist naturalism which describes matter as unstable and eternally ‘in flux’, which support a sonic ontology based on events and becomings. Aside from this emphasis on change and flux not necessarily exempting the model from charges of essentialism, its premise on Nietzschean naturalism which presents nature as an ‘extravagantly creative [...] power’ upholds stereotypically feminized notions of nature as ‘mysterious’ matter, and most significantly as separate from the philosophical subject. Criticisms of new materialisms such as Sara Ahmed’s have noted a general tendency or ‘gesture’ in new materialism,³¹ in which Cox along with many others set up a false dichotomy between ‘realist’ new materialism, and ‘anti-realist’ postmodernism and poststructuralism.³² Contrary to their intended aim in absolving the language-matter dichotomy, these theories actually often re-enact the tendency they are attempting to overcome.³³ Cox’s sonic philosophy/ontology, which insists on a ‘sound-in-itself’, i.e. sound as a ‘mind-independent reality’, rehearses precisely this problematic gesture of new materialism in which matter is a thing-in-itself.³⁴ It presumes the very separation of language/culture and matter/nature it aims to overcome.³⁵ The preservation of this duality, rests upon a continuation of the traditional subject-object relation in which the masculinist subject gives meaning to the feminized object of nature.

As disparate as these three accounts by Schafer, Nancy, and Cox are, they share in common a neglect to address the traditional subject-object relation in how they produce knowledge through sound and listening. As Cox’s account demonstrates with clarity, there is a problematic division between matter and culture which belies a division between the ontology of the object and the epistemology of the subject in sonic naturalism. In building on Haraway’s work, Karen Barad’s onto-epistemology describes the co-constitution of knowledge

through material phenomena, apparatuses, and discursive practices between human and non-human actors. Barad refuses a separation between ontology and epistemology and foregrounds the intertwinement of knowing and being (as well as ethics) within the approach of 'agential realism'. Traditional notions of nature/matter are in need of revision as 'materiality is an active factor in processes of materialization. Nature is neither a passive surface awaiting the mark of culture nor the end product of cultural performances [...] the separation of epistemology from ontology is a reverberation of a metaphysics that assumes an inherent difference between human and nonhuman, subject and object, mind and body, matter and discourse'.³⁶ In their various forms, sonic naturalisms mutually reinforce these damaging dualisms: the re-stabilization of the subject-object binary supports the relation between the masculinist subject/mind/culture and the feminized object/matter/nature.

3. Sounding Situated Knowledges

Sounding situated knowledges is positioned against the prevalence of sonic naturalism in sound studies which has left the traditional subject-object relation undisturbed. If the main aim of feminist critiques of science is the opening up of alternative frameworks in knowledge production, then it is through greater attention to the subject-object relation that its careful renegotiation can be attempted. As outlined above, the tendency of simultaneous appropriation and denial of the feminine of Keller's analysis reveals the dialectical nature of nature-culture dualism and its implications for the subject-object relation. Therefore a Harawayan gesture which rejects the nature-culture dualism and shifts it towards a notion of 'natureculture' is a deconstructive approach that challenges nature-culture, subject-object, and mind-matter dualisms. A move from debates on the so-called nature of sound towards those around the *natureculture of sound* can counter the tendency towards sonic naturalism in sonic knowledge production.

The role of the body as the site of knowledge production is central in Haraway's 'Situated Knowledges,' however its role is complex and multi-faceted:

I am arguing for a politics and epistemology of location, positioning, and situating, where partiality and not universality is the condition of being heard to make rational knowledge claims. These are claims on people's lives. I am arguing for the view from a body, always a complex, contradictory, structuring, and structured body, versus the view from above, from nowhere, from simplicity. Only the god trick is forbidden.³⁷

Haraway's version of feminist embodiment is not a simple or merely literal foregrounding of the physical essentialized body.³⁸ Notably, the infamous figure of the cyborg was an ardently anti-essentialist redress towards previous feminisms which prized the feminine as an innate or natural, biologically given quality. Situated knowledges requires not only a complex embodied

vision, but also the politics of situatedness – positioning, partiality, and an anti-universalism. Above all, the ‘god-trick’ as the view from above is most vehemently rejected. In making the case for sounding situated knowledges, I argue that *both* Haraway’s specific notions of embodiedness and situatedness are necessary in this feminist intervention in contemporary sound studies.

Where Haraway identifies vision as a ‘maligned’ and ‘perverse’ sensory system, there is, I argue, an opening for sounding to bring its affordances into the project of situated knowledges.³⁹ Instead of turning to other sensory modes, Haraway undertakes a re-examination of the metaphor of vision and argues for an embodied vision, ‘(at least) double-vision’.⁴⁰ Haraway’s purposeful return to visual metaphors is worth closer attention, for vision presents *both* problem and solution i.e. the dangerous ‘god-trick’ or ‘view from above’ can feasibly be countered by the embodied ‘view from the body’.⁴¹ Haraway explains her decision to persist with vision as follows: ‘Visual metaphors are quite interesting I am not about to give them up anymore than I am about to give up democracy, sovereignty, and agency and all such polluted inheritances’.⁴² Interestingly, Haraway even makes hints to auditory metaphors, ‘feminist accountability requires a knowledge *tuned to reasonance* [sic], not to dichotomy’, ‘*tones* of extreme localization’ and ‘vibrat[ions]’.⁴³ The complex and contradictory view from the body foregrounds both situatedness and embodiedness for Haraway. One could argue that sound studies’ central positioning of the body and embodiedness positions sounding as pre-disposed to the political-philosophical project of situated knowledges. The notion of situatedness pertains to more complex demands in which the positionality of knowledge production requires acknowledgement of its partiality, including but more than just physical embodiedness. Situatedness refers to the specific political-ethical accountability surrounding the material-semiotic production of knowledge and a Harawayan push to re-think commonly-held notions of traditional dualisms.

It is significant that situated knowledges being about ‘feminist accountability within the context of scientific objectivity as requiring a knowledge *tuned to reasonance, not to dichotomy*’, uses auditory metaphors to counter dualistic thought.⁴⁴ Taking Nancy’s ‘*Listening*’, we can recall his concept of ‘resonance’ as overcoming the subject-object dualism, which despite its ultimate reinforcement of a traditional masculinist subjectivity, nevertheless provides useful provocations in the renegotiation of the subject-object relation. Yet the commonality of embodiedness in sounding and situated knowledges does not guarantee their coalescence. In Harawayan situated knowledges, we can read Nancy’s position as one which, through its centring of the body, reveals the reemergence of masculinist agency as embodiedness *without* situatedness. Thinking through the body which is commonplace in sonic knowledge production does not necessarily bring about the partiality, anti-universalism, and political-ethical demands of situatedness.

I wish to emphasize that sounding situated knowledges should not, however, be read as a gesture of simple inversion to reverse the hierarchy of the

senses and replace the eye with the ear. Rather, it heeds the warning of Jonathan Sterne's audiovisual litany and instead follows an approach to tracing histories along different sensorial modes as tracing different maps to a territory;⁴⁵ theorizing sounding in this model of knowledge production can produce different conceptions of knowledge. It understands the complexity of multi-sensoriality as intermingled variegated bodily experiences.

There have been two notable studies which have theorized thinking through sound where it is useful to examine Harawayan notions of embodiedness and situatedness for sounding situated knowledges: Steven Feld's notion of *acoustemology* (a neologism of acoustics and epistemology)⁴⁶ and Julian Henriques' *sonic ways of knowing* (or alternatively *sonic logos*).⁴⁷ Both Feld's and Henriques' work suggests powerful and profound alternative ways of thinking via sounding.⁴⁸ Henriques' research stems from an ethnography of reggae sound system culture in Jamaica. Far from a 'culture of no culture',⁴⁹ dancehall sessions are proposed as sites of subaltern knowledge production.⁵⁰ Henriques' sonic ways of knowing theorizes from material auditory propagation of soundwaves to propose a dynamic model of thinking which foregrounds processes, inherently open to fluctuations and change.⁵¹ This leads Henriques to theorize a profound challenge to the very notion of knowledge itself: instead of 'scientific skills' of the *epistème* appearing in a hierarchy above other ways of knowing, alternative Greek works for knowledge such as *techné* (indicating skilfulness and proficiency) and *phronēsis* (indicating wisdom and judgement) are suggested by Henriques.⁵² These sonic ways of knowing are emphasized as corporeal, bodily modes of producing knowledge. Sounding, in Henriques' model, brings forth these affordances in a way which supports the embodiedness, partiality and challenge to dualistic modes of thought which Haraway's situated knowledges propose.

Feld's theory of 'acoustemology' emerged from his fieldwork which inquired into the relations between sense of place, knowledge, and acoustic communication amongst the Kaluli people in the Bosavi rainforest in Papua New Guinea. In an updated explanation of the term, similar to Henriques' claim above, Feld positions acoustemology against the metaphysical or transcendental enquiry suggested by epistemology with a capital 'E'.⁵³ Feld draws on Haraway and Bruno Latour's actor-network-theory to propose acoustemology as a theoretical model which deals with 'relational practices of listening and sounding and their reflexive productions of feedback'.⁵⁴ Acoustemology's foregrounding of relational epistemology is likened by Feld to indigenous research methodologies in which philosophical assumptions around reality, knowledge, and values are recognized as paradigmatic and culturally specific.⁵⁵ Feld also positions acoustemology within ethical debates, particularly in accounting for ethnomusicology's colonial past and refers to relationality as key to understanding accountability in human and nonhuman relations.

In both Feld's and Henriques' models of sonic knowledge production, specific affordances from their ethnographic fieldwork appear to provide rich

provocations for sounding situated knowledges. They make strong allusions to potentially profound epistemological openings, particularly where the very definition of what constitutes knowledge is brought into question.⁵⁶ Drawing on Haraway's specific notions of embodiedness and situatedness, these debates need not revert back to conceptions of the body which propagate an uncritical anthropocentrism or a conservative humanism. Both Feld and Henriques describe alternative affordances of sounding which lend themselves towards positioning, partiality, and anti-universalism of sounding situated knowledges in ways which certain new materialist debates can successfully negotiate. Whilst both accounts foreground embodiedness, particularly Henriques', the question of to what extent a Harawayan situatedness is explicitly addressed remains to be answered. I suggest that whilst Feld's and Henriques' accounts do not re-centre whiteness and masculinity in the way the listening subject of sonic naturalism does, further work is required to ensure that 'acoustemology' and 'sonic logos' can facilitate a critical re-negotiation of the subject-object relation in sonic knowledge production.

It is useful to delineate how Haraway's work on situated knowledges departs from debates of feminist standpoint theory to indicate the complexity of the subject-object relation at stake in sounding situated knowledges. Whilst feminist standpoint theory has typically engaged in the discussions of whether women as oppressed subjects are epistemically advantaged,⁵⁷ Haraway's essay on situated knowledges instead sought to foreground an instability of notions of objectivity in knowledge production. Where standpoint theory has tended to invert power-knowledge dynamics, Haraway's situated knowledges and diffractive methodology (developed further in later work) refuses the sharp division between subject and object of knowledge. The embattled discussion of whether a feminist 'objectivity' can exist is 'simply' replaced by the notion of *situated knowledges*.⁵⁸ Against accusations of social constructionist relativism which some readings of her anti-essentialist feminism suggested, Haraway additionally had to fight against an anti-biology antiessentialist interpretation of her work; in other words, Haraway juggles a seemingly impossible contradictory commitment to both positivism and relativism in '*simultaneously* [having] an account of radical historical contingency for all knowledge claims [...] and a no-nonsense commitment to faithful accounts of a "real" world'.⁵⁹ It is after all, necessary for feminist scientists to contribute knowledge to the masculinist scientific traditions – the 'polluted inheritance'⁶⁰ – they have inherited and in which they work within. Within these polluted inheritances, notions of objectivity and subjectivity need to be critically interrogated.

Contra standpoint theory, Haraway's situated knowledges refuse to mirror traditional notions of objectivity which often rely on the metaphor of reflection: 'Reflexivity is a bad trope for escaping the false choice between realism and relativism'.⁶¹ She instead demands *diffraction* over reflection as a central metaphor to refuse the stable ground upon which knowledge production is premised: 'Diffraction patterns record the history of interaction, interference, reinforcement, difference [...] Unlike reflections, diffractions do not displace the same elsewhere [...] Rather, diffraction can be a metaphor for another

kind of critical consciousness[...] one committed to making a difference'.⁶² This insistence on difference rather than a reflection of the same, is central to the critical re-evaluation of the subject-object relation in knowledge production. Haraway's whole body of work can be understood as being underpinned by the desire to 'explode' the 'inherited dualisms that run deep in Western cultures'.⁶³ By foregrounding the role of the embodiedness in knowledge production and thereby the positionality of the knowing subject, Haraway aligns herself with some aspects of the project of standpoint theory. Yet, by insisting on the 'complex, contradictory, structuring, and structured body', it is Haraway's specific notion of 'situatedness' which underpins the project of situated knowledges. Against a flat-reading of 'mere' acknowledgement of place or positionality, 'situatedness' is about the 'situatedness of situated [...] multiple-modes of embedding', i.e. the political-ethical conditions of knowledge production and a commitment to dismantling traditionalist notions which constrain contemporary thought.⁶⁴

Haraway's insistence on the term 'material-semiotic' is how she attempts to surpass the division between matter/nature and language/culture. To speak of the material-semiotic refuses the dualistic divisions, between language/culture and matter/nature as well as the division between epistemology and ontology. Henriques' description of a 'sonic materialism' in which waves and auditory propagation offer metaphors for a dynamic model of thought bears similarities to Cox's model of sonic materiality, which pinpoints sound's capacity for change and flux; both are invested in the characteristics of sound as constantly fluctuating and as transmitting a notion of instability, and its corresponding epistemological metaphors. Both attest to a commitment to sonic materiality and theorizations from it, as a way of overcoming dualisms. However, there is a problematic conflation of sonic realism and sonic materialism in Cox's model. Cox's insistence on 'sound-in-itself' as a reality which is mind-independent is premised upon the separation of language/culture/signification and matter, and ontology from epistemology. Given the aforementioned unaccountability of such universalisms as critiqued by feminist epistemologies, the specific notion of a mind-independent realism put forward by Cox need not play a role in the model of sonic materialism which underpins sounding situated knowledges. Instead, a new materialism which attends to matter without denigrating the role of language or signification can account for the intra-actions between human and non-human actors. If realism must play a role, then only in the form suggested by Barad in agential realism, in which matter is inextricably entangled in material-discursive relations and not posited as passive stuff of a traditional causal relationship out of which science/knowledge is made. This cuts through the dichotomy of mind-independent or mind-dependent conceptions of materiality which Cox insists upon. This form of sonic materialism asserts the inseparability of ontology and epistemology, nature and culture, language and matter in sounding situated knowledges, to renegotiate the subject-object relation in sonic knowledge production.

If sonic naturalism is the result of the uncritical continuation of a traditional subject-object relation, sounding situated knowledges helps to counter the

‘god-trick’ or view from above warned against by Haraway. As feminist science studies has demonstrated the necessity of opening up formerly unquestioned paradigms to enrich previously masculinist scientific cultures, by grounding sonic knowledge production in both embodiedness and situatedness, a closer interrogation of the subject-object relation enables a crucial rethinking to begin. This can counter the tendencies towards universalizing, ahistorical, neutral subjects in sound studies. Whilst much further work remains to be done to outline the precise implications of these feminist interventions into theories of sonic knowledge production, a critical renegotiation of subjectivity and objectivity in sounding situated knowledges must form its basis.

4. Archaeoacoustics and Echo

The relatively recent emergence of archaeoacoustics means that there remains much room for further research in theorizing what the field means for sound studies. The sounding past reveals particular problems for theories of sonic knowledge production. Producing knowledge around past auralities in sound studies inevitably encounters the problematics of historical acoustemology,⁶⁵ namely that we should be aware of contemporary conceptions and attitudes about sound and listening which influence explanations about cultures and social relations of the past.⁶⁶ Accordingly, the matter becomes increasingly recondite once auralities which took place before the invention of the written word are theorized. This poses the problem of how to understand the subject-object relationship in sonic knowledge production in a context ultimately unknowable. For the purposes of this article, I propose this new field to be a critical juncture for theories of sonic knowledge production. I ask, what potential for a political-philosophical ‘elsewhere’ which Haraway gestures towards can be found in archaeoacoustics?

Archaeoacoustics’ positioning of its listener as living in a quieter ‘more natural’ past aligns it with ideas of sonic naturalism. Leading researcher Paul Devereux writes that ‘people in remote antiquity would probably have heard with greater acuity than we do, living as they did in a quieter world, a world in which listening for danger would have been a constant and more important activity than in modern times’.⁶⁷ These ideas about sound and listening are grounded in an origin narrative, similar to Schafer’s version of sonic naturalism. These ideas can be found to be intellectually rooted in Marshall McLuhan’s widely influential theory of media, which describes the historical progression from the ‘acoustic space’ of early pre-Euclidean and pre-literate cultures, to the ‘visual space’ of literate cultures, and returning back to an acoustic space of sorts in the advent of ‘electric culture’.⁶⁸ Sterne’s concept of the audiovisual litany mentioned above has critiqued the attribution of certain qualities to sensorial modes, particularly where these are posited as alternatively dominant or missing in particular historical eras. Yet whilst Sterne’s term forms a poignant and necessary corrective to widespread ideas around hearing and seeing, gendered ideas in the audiovisual litany suggest a complex dialectic of these widely pervasive notions which requires greater examination.

Acoustic archaeologists regard positionality and listening as core to their research methodologies. For example, Iegor Reznikoff, a trained singer and specialist in resonance, uses a primarily voice-led method.⁶⁹ Other researchers use state-of-the-art microphones, speakers, and computers, whilst other researchers use a mixture of noise- and tone-generators, hand-clapping and other instruments such as drums, bull-roarers or other objects.⁷⁰ Devereux, quoted above, speaks of the greater acuity to sound and listening which ancient people had and suggests that by listening ‘better’ we can somehow access how sound and listening were used in social relations of the past. Without doubt, greater attention to sound and listening in archaeological sites may well provide new insights into sites where the acoustics were ignored. Given the particular attention to sound-making and listening in their fieldwork, there is an inherent embodiedness and positionality within the researchers’ methods. One could feasibly propose that this groundedness in the bodily experiences of researchers counters the god-trick Haraway warns against, and lends itself towards analytical reflexivity.

Yet in archaeoacoustics research so far, stereotypes of masculine and feminine characteristics and abilities are found plentifully in research results. For example, Reznikoff comments that it was certainly only men who explored the caves with their voices, as it was ‘very dangerous’ in the caves for women. Devereux claims that due to the resonant frequencies of Neolithic chamber Newgrange at pitches which fall within the male voice range, ‘the potential implication is quite clear: *“these ‘tombs” saw ritual activities, and they were conducted by men”*’.⁷¹ Given the small size of the recently emerged field, the figure of ancient man being constructed in archaeoacoustics still remains to be critiqued by arguments from gender archaeology and postcolonial archaeology to demonstrate how gendered and racialized prejudices are prevalent in archaeoacoustics research.⁷² Currently, and perhaps unsurprisingly, the reification of the normative white, European masculine subject of listening takes place in a very direct way. Traditional subject-object relations are upheld in which the conditions of knowledge production are not subjected to critical questioning.

If we are to consider archaeoacoustics as a potential opening into an elsewhere of sonic knowledge production, the processes of knowledge production via sounding situated knowledges must be interrogated: the physical embodiedness of archaeoacoustics research methods does not combat the ‘god-trick’. The aforementioned difference between embodiedness and situatedness is key: embodiedness alone does not prevent the traditional subject-object relations from persisting. A Harawayan situatedness would require not only a consideration of the body, but of the political-philosophical conditions in which knowledge production takes place. This includes a gendered, racialized, and material engagement with knowledge production. Furthermore, as part of this situatedness it remains to be explored not only reflectively, but diffractively, to ask to what extent archaeoacoustics can bring the traditional subject-object relation into question.

In archaeoacoustics research, ‘unusual’ sound qualities often play a central role – these can take the various forms of notable reverberation, resonance,

sound carrying unusually far and echoes. The field endeavours towards demonstrating an intentionality of acoustic design, or at least admissible evidence thereof.⁷³ Many researchers cite echoes as significant in their field-work.⁷⁴ Steven J. Waller's work in particular proposes a fundamental reconceptualization of what echoes mean. Simple acoustical tests undertaken by the author at Horseshoe Canyon (Utah, USA) and Hieroglyphic Canyon (Arizona, USA) aim to evince a positive correlation between presence of rock-art and the strength of echoes measured in decibels. Waller suggests that echoes, conceived outside of processes of scientific rationalization, can be understood as 'supernatural spirits'. He proposes that rock art could have been intentionally placed at echoing locations due to echoes being 'worshipped as divine' in certain cultural contexts.⁷⁵ Waller's work appears to be positioned against conceptions of echo which have been trivialized by the processes of modern scientific rationalization which Sterne terms the 'Ensoniment' in analogy to the Enlightenment.⁷⁶ Waller suggests a 'magical' pre-Ensoniment understanding of sound and echoes, a sentiment echoed by other significant protagonists of the field.⁷⁷ Although some of his ideas of these may well fall within what some scholars have critiqued as the exoticization of magic in anthropology,⁷⁸ his work nevertheless indicates how the echo outside of its Western scientific definitions can open up a wealth of understandings of sonic knowledge production novel to the field of sound studies.

I suggest the echo as a feminist figuration akin to Haraway's cyborg, through which to theorize the subject-object relationship in archaeoacoustics. As a hybrid material-semiotic figure, a *cyborgian* echo is not only a literary (semiotic) motif but also a literal (material) heuristic for articulating the subject-object relation. A cyborgian echo denotes its simultaneous material-physical conceptions in acoustics and its symbolic-semiotic conceptions in mythology. Echo as an acoustic phenomenon (as a type of reverberation) foregrounds the relationality of the listener to the sound – the listener must recognize both the 'original' sound and its repetition as resembling one another, the positionality of the listener also determines how and what they hear of the original and its repetition.⁷⁹ Barry Blesser and Linda Ruth Salter describe in the context of aural architecture that echo is a 'rudimentary spatial ability [...] the aural means by which we become aware of the wall and its properties, such as size, location and surface materials', which gives listeners a sense of space.⁸⁰ As a mythical figure, Echo too foregrounds relationality. Ovid's *Metamorphoses* has dominated conceptions of the nymph Echo cursed to only repeat the words of others and who is rejected by Narcissus.⁸¹ Gayatri Spivak's essay on Echo reads Narcissus as representing the (masculinist) construction of self-knowledge whilst Echo's (feminine) (non)subjectivity lies outside this realm, as 'a tale of the aporia between self-knowledge and knowledge for others'.⁸² Thus, Echo as myth of audible repetition comes to signify a critical junction between self and other. A cyborgian echo in sonic knowledge production is a material-semiotic figure through which to think the various affordances which sounding brings to situated knowledges. Some characteristics of these have been suggested via the work of Feld and

Henriques above such as: embodiedness, dynamism, relationality, accountability, and a questioning of what knowledge is.

The potential opening which archaeoacoustics could bring to theories of sonic knowledge production can be further demonstrated by outlining the differences between standpoint feminism and Haraway's situated knowledges by the metaphors of reflection and diffraction respectively. On the one hand, insofar as some positions within standpoint feminism have argued for the social position of women as lending an epistemic privilege, the field of gender archaeology has shown that research questions on women and gender have contributed productively to archaeological knowledge with an analytical *reflexivity* according to how contemporary gendered relations affect the interpretation of archaeological data.⁸³ However, on the other hand, sounding situated knowledges provokes a deeper questioning of the subject-object relation as the site of knowledge production. Despite the embodiedness of their research methods, archaeoacoustics researchers remain predominantly self-invisible in their socio-cultural interpretations. The situatedness which Haraway describes as a feminist accountability, and a deeper interrogation of the multi-modal conditions of knowledge production, is not tangibly present in the results which archaeoacoustics have thus far produced. Therefore, not only is the *reflexivity* promoted by standpoint feminism required, but via sounding situated knowledges, a *diffractive* methodology is necessary which disturbs the traditional subject-object relation.

As described above, the phenomenon of diffraction is chosen as a metaphor by Haraway for its closeness to the phenomenon of reflection but this differs in its production of difference. Barad proposes that understanding how the physical diffraction of light is understood in physics, exposes the inseparability of epistemology and ontology.⁸⁴ The echo is an apt feminist figuration for the diffractive methodology in sound. Although echoes in acoustics are often commonly defined as reflected sound, echoes as sonic experiences on a physical-material level (for example taking the aforementioned definition by Blesser and Salter from aural architecture) are constituted by both *reflection and diffraction, as well as refraction*. Therefore, *diffraction* in sounding situated knowledges functions alongside *reflection* to suggest the validity of both metaphors in feminist epistemologies. Echo in archaeoacoustics is a material-semiotic figure through which its speculative potential can be thought. This suggests the reflective metaphor is mobilizing an awareness of heterogeneous subjectivities, which standpoint theories might also advocate, whilst simultaneously, the diffractive metaphor can be considered part of a conscious endeavour to get to a political and epistemological elsewhere. This elsewhere is one in which traditional dualisms are disturbed and diffracted. The co-constitution of knowledge in this model, following Barad, promotes the inseparability of epistemology and ontology.

Spivak's aforementioned essay on Echo serves as a useful allegory for the relations of knowing in archaeoacoustics and sounding situated knowledges. Whilst, as mentioned above, archaeoacoustics has a tendency to theorize

without being attentive to the insights brought about by postcolonial studies, Spivak deconstructs Ovid's dialogue to demonstrate how Echo's partial repetitions of Narcissus' words reveal her disruptive potential. Echo's responses produce a different meaning through their repetition, a fitting example of Derridean *différance* – difference and deferment at the same time.⁸⁵ For archaeoacoustics, echo – in the sense of *that which is reflected back* – can act as a disruption in what the knower knows, or believes to know, or be able to know. Furthermore, Echo is presented as a subaltern figure, thus alluding to the fraught question of postcolonialism famously formulated by Spivak as 'Can the Subaltern Speak?', that is, the representational difficulty of theorizing the subaltern within the epistemic violence enacted through colonialist, masculinist and capitalist relations.⁸⁶ Yet crucially, via Echo, Spivak finds the potential of *différance* and cautiously offers a glimmer of hope for the *agency* of the subaltern. Echo as 'a dubious reward quite outside of the borders of the self',⁸⁷ therefore bears resemblance to Haraway's cyborg: both are born within the 'belly of the monster'.⁸⁸ I suggest that echo has the potential – through its embodiment of difference and destabilization of the knowing subject – of re-negotiating the subject-object relation in sonic knowledge production.

5. Conclusion

Sounding situated knowledges forms the basis for future interventions of feminist epistemologies of thinking through sounding where a critical re-negotiation of the subject-object relationship in sonic knowledge production is centred. True to Haraway's essay on situated knowledges, it is a model which foregrounds both embodiedness and situatedness to avoid the risks of universalizing notions of subjectivity and objectivity which have limited traditional knowledge production. Sonic naturalism, premised upon the continued dualisms of nature-culture, subject-object, mind-matter, continues to form a dominant tendency in sound studies. Though sonic naturalism, as I have argued, takes on various divergent forms, its persistence indicates the pressing necessity of interrogating traditional subject-object relations in sonic knowledge production.

Archaeoacoustics demonstrates a particular case where the stakes of the political-philosophical elsewhere of sonic knowledge production are particularly high. The unknowability of its subject matter has hitherto led to interpretations which expose how sonic naturalism and a traditional subject-object relation have tended towards a reflection of the same. On the one hand, current research has proven rather limited in its interpretation of archaeoacoustic fieldwork – not only in its literal interpretations, for example in gender roles, but also in its epistemological potentials. As described above, in archaeoacoustics the evident sonic naturalism suggests a division between the ontology of the object of nature and the epistemology of the subject. On the other hand, the reorganization of conceptions of knowledge production around sounding indicates affordances which, drawing on Feld's acoustemology and Henriques' sonic logos, can facilitate the embodiedness, relationality, notions

of difference and dynamism and a questioning of the definition of what constitutes knowledge. Archaeoacoustics, if it insists upon the situatedness and embodiedness of sounding situated knowledges might be able to explore alternative frameworks of sonic knowledge production, in which rigid dualisms which separate nature and culture, epistemology and ontology, and traditional subject-object relations are no longer upheld.

The echo as a physical phenomenon which encapsulates reflection and diffraction is posited on a material level, but it can also act on a symbolic level as a sounding disturbance into traditional subject-object relations. The figure of echo as diffraction, which is both material and semiotic, posits the refusal of simply 'reflecting the same elsewhere' and insists upon the metaphor of 'making a difference'. Similar to the way that Spivak's Echo offers a glimmer of hope for disruptive agency, a Harawayan concept of echo draws on her usage of Trinh T. Minh Ha's 'inappropriate/d others', which suggests a 'critical, deconstructive relationality, in a diffracting rather than reflecting (ratio)nality—as the means of making a potent connection that exceeds domination'.⁸⁹ Thus conceived, the echo offers multiple ways of not simply displacing the same elsewhere, but in producing non-self same versions of something (a sound), echo as diffraction embodies difference in a productive way for future examinations of sonic knowledge production. The speculative elsewhere which could be claimed in terrains such as archaeoacoustics or more broadly in sound studies, likely needs further companions of feminist figurations like the echo. Haraway has proposed many in feminist science studies: the cyborg, the coyote, the companion species amongst them. Sounding situated knowledges can produce more of them.

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Notes

¹ This has been articulated in Evelyn Fox Keller's hugely influential work on gender and science where notions of the masculinist objectivity in Western science are analysed. Keller writes of her investigation into how a 'different subjectivity [...] would affect our conception of science' and alludes to a goal of 'enabling us to glimpse what a science less constrained by such an ideology might look like'. See Keller, *Reflections on Gender and Science*, 70–71.

² Although 'listening' might seem to be a more straightforward term to address, I

choose to call this the 'subject-object relation in sound' in this article in keeping with the close relation of Haraway's work to science studies and science and technology studies (STS) and in an attempt to foreground this relation in processes of knowledge production.

³ Karen Barad's articulation of an 'ethico-onto-epistem-ology' is deeply influenced by Donna Haraway's work. As such, although this term was coined by Barad, I attribute it to Haraway's influential thought within and beyond science studies. See Barad, *Meeting the Universe Halfway*, 185.

⁴ Haraway, "Situated Knowledges."

⁵ Reznikoff and Dauvois, "La dimension sonore des grottes ornées"; Scarre, "Painting by Resonance."

⁶ For example, the pioneering research of the field was undertaken by Iegor Reznikoff, a mathematics professor and specialist singer of early Christian chants. Another key figure since the 1990s has been Paul Devereux, an author of several books which investigate various 'earth mysteries' studies of sacred sites and unusual geophysical events.

⁷ Haraway, "Animal Sociology and a Natural Economy of the Body Politic, Part II."

⁸ Haraway et al., "Cyborgs, Coyotes, and Dogs: A Kinship of Feminist Figurations and There Are Always More Things Going On Than You Thought! Methodologies as Thinking Technologies," 330.

⁹ Various theorizations of the role of political-philosophical 'elsewheres' in recent new materialism, speculative realism and object-oriented ontology debates can be found variously addressed in Cecelia Åsberg, Kathrin Thiele, Iris Van der Tuin's "Speculative *Before the Turn*" and Jordana Rosenberg's "Molecularization of Sexuality." Åsberg, Thiele, and Van der Tuin seek to reclaim the importance of feminist speculation amidst the contemporary flourishing of speculative realism and object-oriented ontologies. This speculation entails drawing on science fiction to imagine visionary past, futures and presents as a practice of Haraway-inspired feminist world-making. Rosenberg, on the other hand, addresses the contemporary evocation of an 'ancestral realm' in object-oriented ontologies, which simultaneously implies both the ancestral and futural. Rosenberg reads a capitalist commodity logic into the ontological turn, and undertakes a queer and postcolonial critique of OOO (object-oriented ontology) as a form of fanaticism which acts to marginalize the realm of the social. See Åsberg, Thiele, and van der Tuin, "Speculative *Before the Turn*;" Rosenberg, "The Molecularization of Sexuality."

¹⁰ Haraway writes that this term, 'is intended to portray the object of knowledge as an active, meaning-generating part of apparatus of bodily production, without ever implying the immediate presence of such objects or, what is the same thing, their final or unique determination of what can count as objective knowledge at a particular historical juncture'. The pairing of

'material-semiotic' emphasizes the inextricable link and co-configuration between meanings and objects of knowledge. Haraway, "Situated Knowledges," 595.

¹¹ Haraway's figure of the cyborg is the most well-known of a number of feminist figurations which she develops throughout her writing, for example the coyote, the vampire, and the companion species. These figures are aimed at subverting conventional political-philosophical thought acting as agents through which to think through and beyond the given conditions which Haraway's feminism is positioned against (e.g. socialist, anti-racist, materialist feminisms). See Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century."

¹² Waller, "Intentionality of Rock-Art Placement Deduced from Acoustical Measurements and Echo Myths."

¹³ Blesser and Salter, *Spaces Speak, Are You Listening?*

¹⁴ Schafer, *The Soundscape: Our Sonic Environment and the Tuning of the World*. Tara Rodgers draws on wave metaphors and maritime themes to examine using Luce Irigaray's writings how the aesthetics and politics of the sound wave aligns with feminized notions of fluidity in audio-technical discourses. Reclaiming these notions back from stereotypically masculinist and colonialist histories into metaphors of interconnection, this essay presents powerful and useful ideas for feminist epistemologies of sound. See Rodgers, "Toward a Feminist Epistemology of Sound: Refiguring Waves in Audio-Technical Discourse."

¹⁵ Schafer, *The Soundscape: Our Sonic Environment and the Tuning of the World*, 15.

¹⁶ Thompson, *Beyond Unwanted Sound*.

¹⁷ Schafer's celebration of the 'authenticity' of soundscapes experienced by the earwitness is part of his distaste for unnatural sounds co-opting the 'natural' soundscape including the role of audio recording technology. See for example, his definition of 'schizophonia'. Schafer, *The Soundscape: Our Sonic Environment and the Tuning of the World*, 8–9; 90–91.

¹⁸ Keller, *Reflections on Gender and Science*.

¹⁹ Though the projects of scientific and philosophical epistemologies cannot be posited as interchangeable, feminist critiques of masculinist knowledge production from within science studies and philosophy are often viewed as joint efforts. Most

commonly cited are the foundational texts by Evelyn Fox Keller, who investigates notions of masculine domination and control in science writings, and Susan Bordo, who describes the masculinization of philosophical thought in Cartesian objectivity. Later work specifically on feminist epistemologies reflects this joint inheritance. Keller, *Reflections on Gender and Science*; Bordo, *The Flight to Objectivity*; Alcoff and Potter, *Feminist Epistemologies*.

²⁰ Keller, *Reflections on Gender and Science*, 42.

²¹ Nancy, *Listening*, 37.

²² James, "Affective Resonance," 68.

²³ Nancy, *Listening*, 9.

²⁴ Cox, "Beyond Representation and Signification," 146, 157.

²⁵ Ibid., 147.

²⁶ Seidler, *Rediscovering Masculinity*, 5–13; Haraway, *Modest_Witness@Second_Millennium.FemaleMan_Meets_OncoMouse*, 23.

²⁷ There are a variety of positions which are brought under the terms "Speculative Realism" and "Object-Oriented Ontology." My usage of the two here is not intended to conflate these philosophical movements but instead to point out the commonality to which a feminist critique of an invisibilized male subjectivity and separation of subject and object of knowledge remains highly pertinent.

²⁸ van der Tuin, 'Diffraction as a Methodology for Feminist Onto-Epistemology', 233.

²⁹ Cox, "Beyond Representation and Signification," 146–47.

³⁰ I have intentionally left the "N" of "Nature" capitalized here as I read it to refer to "Nature" as a proper noun, which reinforces my argument of Cox's slippage between "n/Nature" as common and proper noun. Ibid., 147.

³¹ Ahmed, "Open Forum Imaginary Prohibitions."

³² Cox, "Beyond Representation and Signification," 146.

³³ Dennis Bruining elaborates in more detail on Ahmed's argument describes how even within feminist new materialisms, there is a tendency to perpetuate this misrepresentation of postmodernism and post-structuralism as caught in endless relativism and as an 'allergy to the real'. Bruining cites examples of this tendency in the editor introductions to Diana Coole and Samantha Frost *New Materialisms* and

Stacy Alaimo and Susan Hekman's *Material Feminisms*. See Bruining, "Interrogating the Founding Gestures of the New Materialism."

³⁴ Cox refers to Casey O'Callaghan's when asserting, 'Sounds are intangible, ephemeral and invisible; but, O'Callaghan shows, they are nonetheless real and mind-independent'. O'Callaghan, *Sounds*; Cox, 'Sonic Philosophy'.

³⁵ As Dennis Bruining suggests, one of the problems of new materialism is 'its highly problematic conception of matter as a thing in or of itself with its own identifiable agentic drives'. The founding gestures of new materialism are 'premised on the conceptual separation...of matter as a thing that is somehow separate from the background against which it emerges'. Bruining, "Interrogating the Founding Gestures of the New Materialism," 33; 37.

³⁶ Barad, *Meeting the Universe Halfway*, 183, 185.

³⁷ Haraway, "Situated Knowledges," 589.

³⁸ Due to limitations of space, I will not address in detail the large body of feminist theory and philosophy on embodiment and corporeality and their relation to subjectivity and identity. Insofar as Haraway's "Situated Knowledges" theorizes how embodiment and situatedness crucially underpins the subject-object relation of feminist epistemologies, I instead refer to Haraway's cyborgian reading of the body which advocates an anti-essentialist and political-ethical theory of embodiment. To distinguish the Haraway notion of the body from others, I use "embodiedness" over "embodiment."

³⁹ Haraway, 'Situated Knowledges', 581.

⁴⁰ Ibid., 589.

⁴¹ Ibid.

⁴² Haraway, *How Like a Leaf*, 103.

⁴³ Haraway, "Situated Knowledges," 588.

⁴⁴ Haraway, *How Like a Leaf*, 71 (my emphasis).

⁴⁵ Jonathan Sterne notably criticizes the rigid separation of characteristics concerning seeing and hearing which are often presented in a factual manner as the 'audiovisual litany'. Sterne considers these to perpetuate unhelpful dualisms which do not need to be a starting point for cultural analyses of sound, furthermore suspicious for their theological underpinnings. Relevant for the present argument are ideas about hearing tending towards subjectivity

or being about affect, whilst seeing tending towards objectivity or being about intellect. Sterne, *The Audible Past*, 15.

⁴⁶ Feld, "Waterfalls of Song: An Acoustemology of Place Resounding in Bosavi, Papua New Guinea."

⁴⁷ Henriques, *Sonic Bodies*.

⁴⁸ Sounding as described by Henriques, leans on Christopher Small's concept of 'musicking' to emphasize the processes, activities, and multiple actors of a sonic sociality. Small, *Musicking*.

⁴⁹ Haraway uses Robert Boyle as the archetypal white, male and self-invisible (unmarked) subject of European technoscience. The 'modest witness' espouses a specific form of virtuous masculine modesty born in modernity during the so-called scientific revolution. The modern laboratory is the epistemological space which signifies a highly regulated 'culture of no culture'. See Haraway, *Modest_Witness@Second_Millennium.FemaleMan_Meets_OncoMouse*, 23.

⁵⁰ Henriques, *Sonic Bodies*, xxviii.

⁵¹ *Ibid.*, xvii.

⁵² Henriques, *Sonic Bodies*, 244–246.

⁵³ Feld, "Acoustemology," 12.

⁵⁴ *Ibid.*, 15.

⁵⁵ Chilisa, *Indigenous Research Methodologies*; Feld, "Acoustemology," 14.

⁵⁶ For example, Feld speaks of the 'potential of acoustic knowing' and his initial realisation of the Bosavi peoples' sophisticated communication through sound as 'bodily, powerful and gripping' and Henriques speaks of the process of 'sounding' as offering a 'different understanding of the nature of rationality itself' and of sonic logos as part of a 'criticism of representational meaning and linear causality'. Feld, *Jazz Cosmopolitanism in Accra*, 126; Henriques, *Sonic Bodies*, 246.

⁵⁷ Hartsock, "The Feminist Standpoint"; Harding, *The Science Question in Feminism*; Wylie, "Why Standpoint Matters."

⁵⁸ Although this 'simply' is to be understood with a deconstructionist playfulness typical of Haraway. Haraway, "Situated Knowledges," 581.

⁵⁹ *Ibid.*, 579.

⁶⁰ Haraway speaks of 'polluted inheritances' as the wide-reaching political, philosophical, ethical notions and values which one inherits from patriarchal, racist, capitalist, militaristic society which her work is pitted against. This position is also often referred to as working from 'within the

belly of the monster'. Haraway, "The Promises of Monsters: A Regenerative Politics for Inappropriate/D Others," 70.

⁶¹ Haraway, *Modest_Witness@Second_Millennium.FemaleMan_Meets_OncoMouse*, 16.

⁶² *Ibid.*, 273.

⁶³ Haraway, *The Haraway Reader*, 2.

⁶⁴ Haraway, *How Like a Leaf*, 71.

⁶⁵ Smith, *Hearing History*.

⁶⁶ Sterne, *The Audible Past*, 19. Some historians of sound insist upon the use of printed records to verify the meanings ascribed to sonic experiences. Smith, "Echo," 61–62.

⁶⁷ Devereux, *Stone-Age Soundtracks*, 12.

⁶⁸ Schafer's close affinity with McLuhan's theories is well documented, and his palpable influence can be noted in the direct resemblance of 'acoustic space' in Schafer's notion of the 'soundscape'. Paul Devereux makes direct reference to McLuhan's concept of acoustic space. See McLuhan, *Laws of media*; Schafer, *The Soundscape: Our Sonic Environment and the Tuning of the World*, 11; Devereux, *Stone-Age Soundtracks*, 25.

⁶⁹ Reznikoff, "On Primitive Elements of Musical Meaning."

⁷⁰ Some researchers use a variety of the methods mentioned. Till et al., "Songs of the Caves: Sound and Prehistoric Art in Caves Initial Report on a Study in the Cave of Tito Bustillo, Asturias, Spain."

⁷¹ Personal Communication with Iegor Reznikoff. March 2015; Devereux, *Stone-Age Soundtracks*, 89 (original italics).

⁷² See for example: Conkey and Spector, "Archaeology and the Study of Gender"; Moro-Abadía, "The History of Archaeology as a 'Colonial Discourse'."

⁷³ Scarre and Lawson, *Archaeoacoustics*, viii.

⁷⁴ Reznikoff and Dauvois, "La dimension sonore des grottes ornées"; Devereux, *Stone-Age Soundtracks*, 17–19, 20, 95, 120; Watson and Keating, "The Architecture of Sound in Neolithic Orkney," 259.

⁷⁵ Waller, "Intentionality of Rock-Art Placement Deduced from Acoustical Measurements and Echo Myths," 31.

⁷⁶ Sterne, *The Audible Past*, 2.

⁷⁷ Reznikoff, 'JMM'; Devereux, *Stone-Age Soundtracks*, 15.

⁷⁸ Sardan, "The Exoticizing of Magic from Durkheim to 'Postmodern' Anthropology."

⁷⁹ See for example, entries on "Echo," "Delay," and "Reverberation." Augoyard and Torgue, *Sonic Experience*, 47, 37, 111.

⁸⁰ Blesser and Salter, *Spaces Speak, Are You Listening?*, 1–2.

⁸¹ However it can be noted that other Greek poets such as Aristophanes, Philostratus, Callistratus, Apuleius, and Nonnus have alternatively described Echo by herself (in Greek myths Echo appears invariably as a female figure) or in relation to the god Pan.

⁸² Spivak, “Echo”, 19.

⁸³ Conkey and Spector, “Archaeology and the Study of Gender”; Wylie, “Doing Social Science as a Feminist: The Engendering of Archaeology.”

⁸⁴ Barad, *Meeting the Universe Halfway*, 89–90.

⁸⁵ Spivak, “Echo,” 26.

⁸⁶ Spivak, “Can the Subaltern Speak?”

⁸⁷ Spivak, “Echo,” 23.

⁸⁸ Haraway, “Situated Knowledges,” 581.

⁸⁹ Haraway, *The Haraway Reader*, 69.

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